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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/074,098	02/11/2002	Eric S. Fetzer	10016610-1	6706

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EXAMINER

COLEMAN, ERIC

ART UNIT	PAPER NUMBER
2183	

DATE MAILED: 12/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	10/074,098		FETZER ET AL.	
	Examiner		Art Unit	
	Eric Coleman		2183	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8-18 is/are allowed.
- 6) ☒ Claim(s) 1-4,6 is/are rejected.
- 7) ☒ Claim(s) 5 and 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. The scope of meaning of claim 6 is unclear because the claim does not have an end (i.e., a period at the end of the claim).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mahalingaihah (patent No. 5,835,968) Mahalingaihah taught the invention substantially as claims including a data processing ("DP") system comprising:
6. Apparatus and method for forwarding within a processor of the type having an array of pipelines and a register file (e.g., see fig. 1,3 and col. 14, lines 38-57, col. 15, lines 4-26 and col. 17, lines 18-48); writing speculative data from pipelines to first registers (speculative register file), reading the speculative data from the first registers,

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and forwarding the speculative data to the pipelines (e.g., see figs. 1,3 and col. 7, lines 7-41, and col. 11. lines 43-65).

7. Mahalingaihah did not expressly detail (claim 1) the forwarding of speculative data was performed to bypass hazards. However Mahlingaihah taught performing dependency checking for load operations against a pending store and speculatively executing load instruction and performing store operation in program order and if the prediction is incorrect, the data prior to the store memory operation is restored to the predicted way, and the store memory operation is performed in the correct way (e.g., see col. 12, line 36-col. 13, line 3). Therefore it would have been obvious to one of ordinary skill to forward speculative data to bypass hazards. One of ordinary skill would have been motivated to forward speculative data to bypass hazards at least because Mahlingaihah system attempted to prevent hazards in execution of speculative loads by predicting the outcome of the load and checking for dependency problems and also forwarded data from speculative register file to pipelines. The use of the forwarding with load and store instructions would have allowed the data to be more quickly available for access by another instruction and would have reduced conflicts (e.g., see col. 12, line 36-col. 13, line 3, and figs. 1,3 and col. 7, lines 7-41, and col. 11. lines 43-65).

8. As per claim 2, Mahalingaihah taught processing instructions through pipelines (e.g., see fig.1 and, col. 8, line 51-col.13, line 48).

9. As per claim 3, Mahlingaihah taught architecting the data to second registers of the register file after processing one of the instructions (e.g., see col. 18, lines 44-66 and col. 20, lines 44-56). As to the write-back stage, the use of a write-back stage to

store results to the register file after execution was well known in the art at the time of the invention. One of ordinary skill would have been motivated to use a write-back stage in the Mahlingaihah system at least to allow the data register file to be updated.

10. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mahlingaihah as applied to claims 1-3 above, and further in view of Arora (patent No. 6,219,781).

11. Arora taught using a decode register file logic (scoreboard) to architect speculative data in a first portion of the register file without moving data (e.g., see col. 4, lines 54-64). As to the decode register file logic being a column decode register file logic one of ordinary skill would have been motivated to search a particular column of data to access field with the bits indicating whether the data was speculative or not.

12. It would have been obvious to one of ordinary skill to combine the teachings of Mahlingaihah and Arora. One of ordinary skill in the DP art would have been motivated to incorporate the Arora teachings of speculative register scoreboard at least to more efficiently maintain and update the status of the speculative registers.

Allowable Subject Matter

13. Claims 5,7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. Claims 8-18 are allowed.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Flacks (patent No. 6,587,941) disclosed a processor with history file mechanism for restoring processor state after an exception (e.g., see abstract).

Arora (patent No. 6,304,955) disclosed a system for performing latency hazard detection (e.g., see abstract and figs. 1a, 1b, 1c).

Steiss (patent No. 6,766,440) disclosed a microprocessor with conditional crosspath stall to minimize CPU cycle length (e.g., see abstract).

Mohamed (patent No. 6,301, 653) disclosed a processor contained data path units with forwarding paths (e.g., see abstract).

Motomura (patent No. 5,944,811) taught a superscalar processor with parallel issue and execution device having forward map of operand and instruction dependencies (e.g., see abstract).

Bubil (patent No. 6,012,137) disclosed a special purpose processor with multiplexors for input to register file and output of register file to ALU (e.g., see abstract and figs. 2a, 2b).

Heeb (patent No. 6,430,679) disclosed a pre-arbitrated bypassing in a speculative execution microprocessor (e.g., see abstract).

Thomas (patent No. 5,535,346) disclosed a data processor with future file with parallel update and method of operation (e.g., see abstract and figs. 1,3,5).


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric Coleman whose telephone number is (571) 272-4163. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on (571) 272-4162. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

EC



ERIC COLEMAN
PRIMARY EXAMINER